FORESTRY IN HAWAII

Why the practice of Forestry is an economic necessity in the Hawaiian Islands.

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In Hawaii the forest is a prime factor in the maintenance of economic prosperity. Water and wood are fundamental needs in every community. In Hawaii this is even more true than on the mainland. Essentially a country dependent on agriculture, success in Hawaii may justly be said to rest on the right use of water. Because of its geographic position and the conditions of climate, topography and soil that characterize the islands an assured water supply is a vital necessity. To insure a sufficient supply of water for irrigation, for power development and other economic uses, and even for domestic supply requires that the forest on all the important watersheds and catchment basins be protected and permanently maintained. A dependable supply can only be obtained with the aid of the forest. Hence it follows that forestry has come to be practiced by the large owners of private lands and by the Territorial Government.

The importance of the forest is generally recognized in Hawaii and has led to a strong public sentiment in favor of forestry. This finds expression in a Territorial Forest Service, the Division of Forestry of the Board of Agriculture and Forestry, an office carried on by technically trained men, who are charged with the creation and administration of forest reserves and with the prose-

cution of other forest work. Hawaii is one of the eleven states in the Union to employ a professional forester.

During the past five years under a definite forest policy systematically followed, twenty forest reserves have been set apart, with an aggregate total area of 545,764 acres (July 1, 1909). Of this area 357,180 acres, or 65 per cent, is land belonging to the Territorial Government. The other 35 per cent. is in private ownership but for the most part the owners of the lands, fully aware of the benefits of forest protection, cooperate actively with the Territorial Government in the management of the forest. It is estimated that eventually, about three-quarters of a million acres will be included within forest reserve boundaries, of which about 70 per cent. will be Government land.

There are three main types of forest in Hawaii; the Koa and Ohia forest lying between the elevations of two and six thousand feet; the Mamani forest, found on the upper slopes of the higher mountains; and the introduced Algaroba forest, which occurs at the lower levels on the leeward side of each of the larger islands.

The typical Hawaiian forest is of the first type. The forest consists of a dense jungle of trees, high growing shrubs, tree-ferns and climbers, with much undergrowth and a heavy ground cover of ferns and bracken. Altogether it is a plant community admirably adapted for the conservation of moisture, for preventing erosion and for serving as a reservoir to feed the springs and

streams that rise within its bounds. The most important trees are Ohia Lehua (*Metrosideros polymorpha*) and Koa (*Acacia Koa*). The forest in all but one of the forest reserves is of this type. The Koa and Ohia forest covers approximately 1,175,000 acres.

Above the level of the Koa and Ohia forest, on the slopes of Mauna Kea (elevation 13,825 feet) on the Island of Hawaii, is found a nearly pure stand of another native Hawaiian tree, Mamani (*Sophora chrysophylla*). This forest occurs in a belt lying between the elevations of 6,000 and 8,500 feet. The area of the Mamani forest on Mauna Kea is 63,500 acres. Mamani occurs elsewhere in the Territory but does not at the present time form what may be called forests. It is, however, spreading rapidly so that in future years it will play a much larger part than it does now. Mamani makes excellent fence posts, for which purpose the trees in the upper forest belt are cut for local use. Otherwise this type of forest is unimportant commercially.

The Algaroba (*Prosopis juliflora*) is the Mesquite of the American Southwest. This tree was introduced into the Islands in 1837. It has now spread so as to cover between fifty thousand and sixty thousand acres below an elevation of 1,000 feet in the leeward districts of the larger islands of the group. It is spreading rapidly along the leeward coasts and is also gradually climbing to a higher elevation. The Algaroba forest is the largest single source of fuel supply in the Territory. It is estimated that

over 3,000 cords are sold annually in Honolulu. The price varies from $12 to $14 a cord, delivered, The Algaroba forests are further of value because the pods make good stock feed and also because the tree is one of the important plants locally for bee food. It is estimated that for the calendar year 1907, the total amount invested in apiaries and other equipment for the manufacture of Algaroba honey was $125,000. and that the gross receipts for Algaroba honey products for the year were over $25,000.

The forests of Hawaii are readily divided into two main classes, which have been termed respectively the "water-bearing forest" and the "commercial forest". Both are of economic value: one because it helps to conserve water; the other because it is a source of wood and timber. The forests of the former class are by far the most important in the economic life of the Territory. They are as a rule situated on the windward slopes of the mountains on each island that intercept the moisture laden clouds brought in by the Northeast trade winds. By serving as a protective cover on the short, steep watersheds the forest helps materially to make the water of use to man, for in Hawaii the relation between watershed protection and the availability of the streams for use, is peculiarly intimate and direct. Water is the most valuable product of the water bearing forests. Consequently the form of management indicated for this class is the one that will cause the forest to yield the largest possible quantity of water, delivered in as regular a flow as

possible. Because of the character of the Hawaiian forest, this means that for the most part this class of forest must be treated as a "protection forest", from which fire, animals and trespass shall be strictly excluded. Only by managing it in this way can the forest be made to render its full duty to the community.

The forest problems of Hawaii are essentially those of conservation rather than of commercial utilization, but the second main class of forest—the commercial forest—is important locally because of the steadily increasing demand for wood and timber and also because of the fact that transportation charges materially increase the cost of construction timber and the other wood products that have to be imported. The commercial forest is of three kinds; the native Koa and Ohia forest, the introduced Algaroba forest (of which mention has already been made) and the forest plantations of trees of economic importance that have been planted artificially.

The two Hawaiian woods of commercial importance are Koa and Ohia Lehua. Both are heavy, close-grained hardwoods. Koa is used for interior finish, furniture, cabinet work and veneering. It is now sold in the markets of the American mainland under the name "Hawaiian Mahogany". Ohia is valuable for railroad ties. The systematic lumbering of this class of Hawaiian forest began in October 1907, when a contract for Ohia railroad ties was made between a local company and the Santa Fe Railway. Both

the Koa and the Ohia forests of the commercial class are found in the leeward districts on the Island of Hawaii, where owing to the remarkable porosity of the soil there are no permanently running streams and where consequently water shed protection becomes unnecessary.

The fact that none of the native trees in Hawaii furnish construction timber has led to extensive tree planting, both by the Territorial Government and by private interests. This work has been going on for the last thirty years and is constantly increasing in extent and importance. The trees principally planted are several kinds of Eucalyptus, the Australian Ironwood and Silk Oak and the Japanese Cedar. Wood and timber cut from the planted forests in Hawaii is now being used for fence posts, railroad ties, bridge timbers and wagon work. Practically all the construction timber now used in Hawaii is imported from Puget Sound and Northern California, mainly Redwood and "Northwest" (Douglas Fir).

For these reasons an important phase of forest work in Hawaii is the introduction into the Territory of trees of economic value. Many excellent kinds have already been secured and have become established. Much more work remains to be done both in introduction and in forest planting, for there are considerable areas of waste land throughout the Territory that can only be made productive by being brought under forest. The Division of Forestry maintains nurseries to supply seedling trees at cost price for forest planting and stands ready at all times to

give advice and
to undertake for
tree planting is
a fact that cannot but make for the increased prosperity of the Territory.

Protection from fire is afforded the forests of Hawaii by a forest fire law enacted by the Legislature of 1905 that provides strict penalties in case of damage resulting from the careless use of fire and establishes a forest fire organization. Under this law a corps of influential citizens has volunteered as District Fire Wardens. Since the enactment of this law there have been no fires of any consequence. This it is believed, is due in large measure to a better public sentiment, resulting from the agitation of the subject.

In Hawaii then the forest has an important part to play in the domestic economy of the Territory. Primarily of value as a protective cover on the watersheds of the streams needed for economic use the forest contributes directly and in a vital way to the prosperity of the islands. In a less pronounced but nevertheless important manner the forest contributes to the welfare of the community by producing wood and timber, while through the introduction of valuable exotic trees the forest cover is gradually being extended over areas of otherwise unproductive land. The province of forestry in Hawaii is to care for the existing forests in such a way that they shall be of the greatest service to men and to extend the forest area wherever the wisest use of the land is the growing of trees.